THE USE AND ABUSE OF CURSUS IN TEXTUAL CRITICISM

THE CURSUS CONCEPT

Mediaeval prose authors sometimes arranged the last few words of their sentences (or clauses) so that accented and unaccented syllables formed certain rhythmical patterns (cursus). The most popular patterns were as follows :

[1] Cursus velox	*...hŏmĭnĕm|rĕcĕpĭstĭs*
[2] Cursus planus	*...ĭllŭm|dēdŭxĭt*
[3] Cursus tardus	*...resilīrē|tēntāvērĭt*
[4] Cursus trispondiacus	*...dŏnā|sēntĭāmŭs*

There are several subtypes of these four main patterns, owing to the fact that the location of the interspace of the two words involved may vary and that a cursus may even be built up of three (or more) words instead of two. Thus, for example, the cadence *...contĕmnērē\|pŏssŭmŭs* may be regarded as a subtype of cursus tardus and the cadence *...spĭrĭtŭm\|nōn\|hăbĕrĕ* forms a subtype of cursus velox [1].

THE PROBLEM

In many mediaeval-Latin texts, the ends of the sentences form cursus and the cursus have now and then been considered a useful tool in editing texts (at least when there are no

1. Thus, the cursus are based on accents. In Latin of the classical period, there were no cursus, but there was another kind of rhythmical cadence, based on the quantity of the syllables. In the following discussions, I shall deal almost exclusively with cursus, but occasionally I shall refer to the cadences of the classical period, which I shall call " metrical clausulae ".

other, more reliable arguments available; in the discussions below, it has been assumed that there are no such other arguments). It has been argued that an editor of such a text, when confronted with two alternative readings, which are located at the end of a sentence, should follow the principle of choosing the reading which forms one of the desired rhythmical patterns and reject the other reading as inferior, if it does not form such a pattern. Stated in this crude form, the principle bluntly defies the basic rule that statistics do not apply to individual cases. Nevertheless, it is exactly by such primitive reasoning that certain critics are guided in judging textual problems.

This study centers round a very trifling matter: the problem of whether the concept of cursus can be helpful in establishing the correct text of a passage in the Sermo Angelicus of S. Bridget of Sweden. My seemingly disproportionate interest in this detail calls for an explanation. In my edition of the text (*Sancta Birgitta, Opera minora II, Sermo Angelicus*, ed. S. Eklund, Stockholm 1972) I had in one passage (9:16), without taking cursus into consideration, preferred, for other, very good reasons (see note 9), the reading *miserabiliter incurrerunt* to the alternative *inseparabiliter incurrerant*. On the occasion of a competition for a professorship at a Swedish university, a member of the approbation committe criticized me for non corroborating my choice *miserabiliter incurrerunt* with the argument that this sequence of words forms a cursus, whereas *inseparabiliter incurrerant* does not conform to any of the intended rhythmical patterns, i.e. for *not* applying statistics to an individual case. When his mistake was pointed out to him, he earnestly — and not without a certain eloquence — defended the impossible position he had taken up; he seemed, in fact, persuaded that he had made no mistake at all. The prolonged discussion that ensued — unsatisfactory to the participants and more ridiculous than amusing to observers, I suspect — would perhaps best be consigned to oblivion. The reason why I mention it here is twofold. Firstly it forms a justification for publishing this study, since the conditions under which the statistically established frequency of a certain rythmical pattern may help to establish the text of an individual passage apparently need to be clarified for certain editors

of mediaeval-Latin texts. Secondly, it explains why I found it convenient to take the insignificant passage from *Sermo Angelicus* as the pivotal point of the study.

To my knowledge, there has been hardly any methodological discussion of the problem of applying the cursus concept in choosing between alternative readings. Attention has been focussed on the use of the metrical clausulae (cf. note 1) for the same purpose in texts of the classical or post-classical period. In the following study, I shall consider exclusively the mediaeval cursus, but, as far as I can see, the conclusions reached below would, *mutatis mutandis*, be applicable to the metrical clausulae as well [2].

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2. The following scholars have commented on the possibility of using metrical clausulae (or, occasionally, cursus) in textual criticism (I do not claim that the list is complete); L. HAVET, Cicero, De oratore, *Revue de philologie* 17, 1893, pp. 33 ff. and 141 ff.; W. MEYER, *Die rythmische lateinische Prosa* (published 1893), *Gesammelte Abhandlungen zur mitellateinischen Rythmik II*, Berlin 1905, p. 270; E. NORDEN, *Die antike Kunstprosa II*, Leipzig 1898, pp. 952 f.; Th. ZIELINSKY, Textkritik und Rhythmusgesetze in Ciceros Reden, *Philologus* 65, Leipzig 1906, pp. 604 ff.; L. LAURAND, *Études sur le style des discours de Cicéron*, Diss., Paris 1907, pp. 208 ff.; E. LÖFSTEDT, Zu Senecas Briefen, *Eranos* 14, Gothenburg 1914, pp. 142 ff.; W. H. SHEWRING, Prose-rhythm and the comparative method, *The Classical Quarterly* 25, London 1931, pp. 20 ff.; S. LILLIEDAHL, *Zur Frage vom "inneren" Wert der Klauseln in der späten lateinischen Prosa*, Linköping 1932; B. AXELSON, *Senecastudien, Lunds universitets årsskrift*, Ny följd, Avd. 1, Band 29, Nr. 3, Diss., Lund 1933, pp. 7 ff.; B. AXELSON, *Neue Senecastudien*, same series, Avd. 1, Band 36, Nr. 1, Lund 1939, pp. 23 ff.; M. J. SUELZER, *The Clausulae in Cassiodorus, The Catholic University of America, Studies in Medieval and Renaissance Latin Language and Literature XVII*, Diss., Washington 1944, pp. 31 ff.; A. FRIDH, *Études critiques et syntaxiques sur les Variae de Cassiodore, Göteborgs Kungl. Vetenskaps- och Vitterhets-samhälles handlingar*, Sjätte följden, Ser. A, Band 4, No. 2, Diss., Gothenburg 1950, pp. 5 ff. (for this study, see note 14 below); A. SZANTYR, *Lateinische Syntax und Stilistik, Handbuch der Altertumswissenschaft* 2,2,2, Munich 1965, p. 719.

These scholars have generally been in favour of using metrical clausulae in textual criticism and some of them have done so in many passages. Yet some of them have also pleaded for great carefulness. Shewring, for example, states this principle, which he has adopted from Laurand: "In textual criticism the metrical criterion has sometimes been abused. The soundest principle is that stated by Laurand: an author's known preferences may be freely relied on for the rejection of emendations which substitute an unmetrical form for a metrical one; they may often determine among MS. variants in favour of a preferred form; rarely they may be alleged to support an entirely new emendation." Axelson also takes a comparatively moderate position; concerning Seneca's *Epistulae morales*, in which there is a very high frequency of metrical

In spite of the lack of methodological discussions of the value of the cursus concept in textual criticism, there has developed a kind of current practice (mainly based on the practice established for the metrical clausulae of the classical period). I shall start by outlining this practice and by pointing out some weak points and errors caused by it. I shall then propose a new statistical approach to the problem, which — as far as I can see — is more correct than the current one [3]. Unfortunately, every treatment of the subject of cursus seems to require great many boring statistical tables. I have concentrated all the necessary statistical information in Table 1 and, since I shall often refer to this table, I start by explaining it.

In Table 1 have been listed the patterns of accented/unaccented syllables which may occur at the end of a sentence. The 28 patterns had already been listed by T. Janson in his book entitled *Prose Rhythm in Medieval Latin from the 9th to the 13th Century*, Stockholm 1975 (this book will henceforth be

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clausulae, he says (*Neue Senecastudien*, pp. 25 f.): "Als erster Grundsatz gelte, dass das rhythmische criterium veri weder zu unterschätzen noch zu überschätzen, d.h. durchweg zu berücksichtigen, aber meist nur als supplementäres Instrument heranzuziehen ist. Die mechanische Folgerung: rhythmisch gut, also richtig — rhythmisch schlecht, also falsch, wird wohl allerdings für gewöhnlich recht behalten, aber auch nur für gewöhnlich. Zu einer für uns absoluten Instanz erhebt sich die Klauselprobe nur in Fällen, wo zwei in allen sonstigen Beziehungen gleich gut qualifizierte Lesungen einander gegenüberstehen." Cf. also Szantyr, p. 719: "Bei philologischer Auswertung des Rhythmus für Rückschlüsse und Entscheidungen in textkritischen Fragen ist jedoch mit Rücksicht auf die letzten Endes nur relative Verbindlichkeit der Klauselgesetze äusserste, die gesamte rhythmische Praxis des betreffenden Autors berücksichtigende Sorgfalt geboten...".

However, in spite of such general reservations, on which all scholars will probably agree, certain important, methodological questions have more or less been left aside in the literature listed above. It is my aim to discuss in this paper — as far as cursus is concerned — such neglected issues, primarily the question how frequent cursus must be in a text to allow of conclusions being drawn concerning individual passages and also the interaction between the desire to create cursus and other factors which influence the frequency of cursus in a text.

3. In making this study, I had very fruitful discussions with Prof. J. Blomqvist, of Copenhagen, and Prof. T. Hägg, of Bergen. Docent T. Janson, of Stockholm, also read an earlier version of the paper and suggested several improvments. The statistics have been checked by docent J. Vegelius, of Uppsala, who is, however, not responsible for any of the statistical mistakes that may occur.

Table 1

Type of cadence		*Sermo Angelicus* Observed frequency No.	%	*Sermo Angelicus* Expected frequency No.	%	*Chronicae Polonorum* Observed frequency No.	%	*Chronicae Polonorum* Expected frequency No.	%	*Homo Conditus* Observed frequency No.	%	*De esse Dei* Observed frequency No.	%	Average * Observed frequency No.	%	Janson's notation
1	⩾6	11	3,0	11	3,0	0	0	0	0	5	1,3	17	4,6	37	2,2	6p/6pp
2	–|– ⏑ –	3	0,8	2	0,5	0	0	1	0,2	1	0,3	5	1,3	10	0,6	1 5p
3	⏑ – |– ⏑ –	12	3,2	10	2,7	1	0,4	2	0,7	12	3,2	12	3,2	47	2,7	p 5p
4	⏑ – – |– ⏑ –	3	0,8	6	1,6	6	2,2	5	1,7	4	1,1	3	0,8	20	1,2	pp 5p
5	–|– ⏑ – –	1	0,3	1	0,3	0	0	0	0	1	0,3	21	5,6	32	1,9	1 5pp
6	⏑ – |– ⏑ – –	8	2,2	7	1,8	1	0,4	0	0,1	3	0,8	17	4,6	43	2,5	p 5pp
7	⏑ – – |– ⏑ – –	3	0,8	4	1,0	0	0	1	0,2	1	0,3	7	1,9	22	1,3	pp 5pp
8	–|– ⏑ –	1	0,3	14	3,7	0	0	18	6,7	9	2,4	27	7,3	55	3,2	1 4p
9	⏑ – |– ⏑ –	TRISPONDIACUS 54	14,5	81	21,8	36	13,4	53	19,6	33	8,9	23	6,2	126	7,4	p 4p
10	⏑ – – |– ⏑ –	VELOX 88	23,7	48	12,9	167	62,1	132	49,1	10	2,7	14	3,8	66	3,9	pp 4p
11	–|– ⏑ – –	4	1,1	6	1,6	0	0	1	0,3	11	3,0	14	3,8	48	2,8	1 4pp
12	⏑ – |– ⏑ – –	TARDUS 50	13,4	36	9,6	10	3,7	3	1,0	10	2,7	13	3,5	133	7,8	p 4pp
13	⏑ – – |– ⏑ – –	9	2,4	21	5,7	0	0	7	2,4	5	1,3	5	1,3	50	2,9	pp 4pp
14	⏑ – – |– | ⏑ –	Var. of velox 6	1,6	2	0,4	12	4,5	2	0,6	5	1,3	5	1,3	16	0,9	pp 1 3p
15	other |– | ⏑ –	5	1,3	3	0,9	8	3,0	1	0,3	4	1,1	12	3,2	36	2,1	other 1 3p
16	⏑ – |– ⏑ –	PLANUS 33	8,9	29	7,8	4	1,5	7	2,5	42	11,3	39	10,5	216	12,6	p 3p
17	⏑ – – |– ⏑ –	7	1,9	17	4,6	2	0,7	17	6,3	14	3,8	11	3,0	69	4,0	pp 3p
18	⏑ – |– | ⏑ – –	Var. of tardus 4	1,1	1	0,4	3	1,1	0	0,1	11	3,0	7	1,9	42	2,5	p 1 3pp
19	other |– | ⏑ – –	1	0,3	1	0,3	1	0,4	1	0,3	5	1,3	7	1,9	27	1,6	other 1 3pp
20	⏑ – |– ⏑ – –	16	4,3	14	3,7	9	3,3	3	1,3	36	9,7	14	3,8	156	9,1	p 3pp
21	⏑ – – |– ⏑ – –	Var. of tardus 3	0,8	8	2,2	0	0	9	3,2	9	2,4	8	2,2	73	4,3	pp 3pp
22	⏑ – – |– | ⏑ – –	Var. of velox 0	0	0	0	0	0	0	0	1	0,3	1	0,3	2	0,1	pp 1 1 2
23	⏑ – |– | ⏑ – –	Var. of planus 5	1,3	2	0,6	0	0	0	0,1	11	3,0	15	4,0	45	2,6	p 1 2
24	other |– | ⏑ – –	3	0,8	1	0,4	0	0	1	0,2	15	4,0	11	3,0	38	2,2	other 1 2
25	⏑ – – |– ⏑ – –	Var. of velox 3	0,8	1	0,4	4	1,5	0	0,1	6	1,6	1	0,3	8	0,5	pp 2 2
26	other |– ⏑ – –	20	5,4	20	5,4	5	1,9	2	0,8	48	12,9	30	8,1	138	8,1	other p 2
27	⏑ – – |– ⏑ – –	7	1,9	13	3,4	0	0	6	2,2	37	9,9	12	3,2	89	5,2	pp 2
28	–	12	3,2	12	3,2	0	0	0	0	23	6,2	21	5,6	68	4,0	1
Totals		372		371		269		272		372		372		1712		

* Under this heading have been reported the total occurrences in the writings of six unrhythmical authors (specified in the text); the percentages accordingly indicate the average frequency of each pattern in unrhythmical texts.

referred to as " Janson "). As pattern 1, under the notation of ⩾ 6, have been registered all sentences ending with a word of six or more syllables. Patterns 2-7 comprise sentences ending with five-syllable words etc. The pure forms of velox, tardus and planus appear as patterns 10, 12 and 16 respectively, but there are also several subtypes with the same sequence of accented/unaccented syllables, although with different interspacing of the words; they have been marked " Var(iant) of velox " etc. No accent has been marked on monosyllables, since they may either be stressed or proclitic/enclitic. As regards proclisis/enclisis and other similar problems, I have simply adopted Janson's practice.

Under the heading of *Sermo Angelicus*, " Observed frequency ", I have listed the frequency of each pattern as counted in my edition of the *Sermo Angelicus* text, giving both the number of occurrences and the percentage. The column " Expected frequency " will be explained later on. I restricted the survey to sentences ending with full stops, question marks and exclamation marks, leaving aside endings of individual clauses within the sentences [4]. I also left out the prologue of the text and the *rubricae leccionum*.

As we shall see below, the author of the *Sermo Angelicus* text had an intention of creating cursus. This, however, does not mean that the *Sermo Angelicus* text is thoroughly rhythmicized. On the contrary, the frequency of cursus is comparatively low in the *Sermo Angelicus*. As a contrast to the *Sermo Angelicus*, I have also described a text in which there is really a very large amount of cursus, viz. the *Chronicae Polonorum* (under the headings *Chronicae Polonorum*, " Observed frequency "). In this case, it was not necessary to do any counting, since the figures are available in Janson's appendix 1 (p. 113, no. 39).

For reasons to be explained below, I have also investigated two other texts, viz. Magister Mathias's *Homo Conditus* and

4. However, I carried out a similar investigation concerning the individual clauses. It turned out that the frequency of cursus in the individual clauses is about the same — in fact a little lower — as the frequency in the complete sentences, so the conclusions reached below are applicable to the individual clauses of the *Sermo Angelicus* text as well as to the complete sentences.

Duns Scotus's *De esse Dei* and described the observed frequencies [5]. For the " Average " column, see below.

Finally, on the right-hand side of Table 1, I have given Janson's notations of the patterns, thus facilitating comparison with the information given in his book.

EXPECTED FREQUENCY

By coincidence, every text contains some instances of cursus even though the author did not deliberately aim at such rhythmical patterns. It is not until the frequency of cursus is significantly beyond this random occurrence that we may speak of any intention on the author's part. The random frequency is generally termed " expected frequency ", i.e. the frequency each pattern is expected to show in the text if the author has not favoured certain patterns. It is necessary to summarize here the methods of calculating the expected frequency, since they are essential to our understanding of the problem.

There are basically two methods, viz. the method of " internal comparison " and the method of " external comparison ". They both have advantages and drawbacks. The internal comparison introduced by Janson (pp. 19 ff.) implies the following procedure. The last word of each sentence of the text (or a sample of the text) is picked out and the words thus collected are distributed into groups with regard to the number of syllables and the location of the accent (one syllable, two syllables, three syllables with penultimate accent, three syllables with antepenultimate accent, etc.). The number of occurrences within each group is noted. The procedure is repeated with the last but one word of each sentence. It is now assumed that every type of last but one word may be freely combined with every type of last word, but, since certain types of words are

5. The *Homo Conditus* is available in a typerwritten edition by M.-O. Engberg and A. Piltz of the Department of Classical Philology at Uppsala University (a printed edition is in preparation) ; chapter 3 and part of chapter 4 have been checked. As regards *De esse Dei*, pp. 35-81 of Duns Scotus, *Philosophical Writings, A Selection*, edited and translated by A. Wolter, London 1962, have been checked. The actual counting of the cursus has been carried out on my behalf by Mr. Per-Ake Green, of Uppsala.

more frequent than other types, certain combinations are also more frequent than other combinations [6]. The expected frequency of each combination of words (= the 28 patterns in Table 1) may easily be calculated by statistical rules, as described by Janson on pp. 19 ff. I have carried out such calculations as regards *Sermo Angelicus* and *Chronicae Polonorum* and shown the results in Table 1 under the headings of *Sermo Angelicus*, " Expected frequency ", and *Chronicae Polonorum*, " Expected frequency ". Thus, an internal comparison concerning the *Sermo Angelicus* text means a comparison between the *Sermo Angelicus* " Observed frequency " column and the *Sermo Angelicus* " Expected frequency " column.

So much for the internal comparison. The external comparison means a comparison with other texts which are known not to be rhythmical. The first problem here is to make sure that the texts chosen are really free of intended rhythm. One may choose texts of such a kind that no rhythm may be expected and one may also check them be means of the internal comparison. The internal method is especially accurate when the degree of intention is low (but yields distorted results when the intention increases ; see below) and, if the internal comparison does not indicate any intention in the text chosen, one may be quite sure that there is no intention whatsoever. In this way, I have chosen the text samples from Magister Mathias (*Homo Conditus*) and from Duns Scotus (*De esse Dei*), in which there is no intended cursus at all. The figures have been listed in Table 1.

There is, however, a much more serious problem connected with the external comparison, viz. the variation of frequency for each pattern when different texts are considered. Take, for example, pattern 5. There is one instance only in *Homo Conditus* but no less than 21 instances in *De esse Dei*. In other words, the expected frequency for pattern 5 ranges from 1 to 21 instances (0.3-5.6 %) when calculated by the external method. Such variations of frequency are due to other causes than cursus (their importance will be further discussed under the

6. In this calculation, the last two words of each sentence are considered ; sometimes it may be necessary to consider three or more words (cf. note 13 below).

heading " Individual factors apart from cursus " below) ; these variations due to other causes may, of course, appear also in texts whose authors cared about rhythm. To some extent, such inconveniences may be minimized by merging figures from several unrhythmical texts into one standard, hoping that all extremes will disappear. In doing so, I have added up the figures for *Homo Conditus* and *De esse Dei* and four other unrhythmical authors [7], putting the result under the heading " Average " in Table 1. Thus, a comparison concerning the *Sermo Angelicus* text by the external method means a comparison between the *Sermo Angelicus* " Observed frequency " column and the " Average " column.

The internal comparison has the advantage of being an accurate method in tracing the presence of intention to create cursus. For that reason, I have used the internal comparison in the following section (Intended cursus), in which I establish which patterns were actually favoured in the *Sermo Angelicus* text. However, one serious drawback of the method is the fact that the expected frequency tends to increase above the correct value when the amount of intention increases (Janson, pp. 26 f.). This means that, whenever there is a very high degree of intention, there is also a far too high expected frequency, when this is calculated with the aid of the internal comparison. As long as the purpose is to verify the *presence* of intention, this error is of no importance, since the expected frequency always lags behind the observed frequency when intention is present, but, as soon as one tries to establish the *degree* of intention, it is serious, especially in those texts whose authors had a high degree of intention to create cursus. Since cursus could be used for textual criticism primarily in texts of that kind, and since, as we shall see, the *degree* of intention and not the *presence* of intention, is a decisive factor, we cannot use the internal comparison in judging whether cursus may be used as a tool in textual criticism or not.

7. As regards these four texts, the figures have been taken from Janson's appendix 1 (pp. 107 ff.). The four texts are *The Letters of Meinhard of Bamberg* (Janson, no. 21), *The Letters of Alcuin* (Janson, no. 53), the *Rationes dictandi* of Hugh of Bologna (Janson, no. 48), and, finally, the *Flores rhetorici* of Alberic of Monte Cassino (Janson, no. 27).

As a matter of fact, tests have shown that, if internal comparison is made the basis for such judgements, the error just described tends to decrease the usefulness of the cursus concept below its real value, thus denying it a fair chance. For that reason, I have used the internal comparison only in the following section (Intended cursus), in which the presence of intention on the part of the author of the *Sermo Angelicus* is proved. In the other sections, I have resorted to the external comparison, since, in these sections, it is not the presence of intention but the degree of intention that is the vital factor.

INTENDED CURSUS

It was stated above that intention on the author's part is present when the observed frequency of some pattern(s) significantly exceeds the expected frequency (as calculated by means of the internal or external comparison). To begin with, I shall concentrate on comparisons between the observed *Sermo Angelicus* frequencies (Table 1, *Sermo Angelicus*, " Observed frequency ") and the expected frequencies, as calculated by means of the internal method (Table 1, *Sermo Angelicus*, " Expected frequency ").

The observed frequencies of pattern 10 (velox) and 12 (tardus) are so much higher than the expected frequencies that they were obviously intended by the author, a conclusion which is in accordance with a chi-square test, as described by Janson on pp. 20 ff. It is possible also that pattern 14 was intended, but the numbers of instances (6 and 2 respectively) are too small to allow of any reliable conclusion being drawn.

As regards patterns 2-9, 11, 13 and 15-27 (patterns 1 and 28 are left aside in this study, just as they were in Janson's), the observed frequencies do not significantly exceed the expected frequencies and no intention is proved (however, for pattern 9, see below). This result is in accordance with those previously published by H. Aili, of Stockholm University, who checked a sample of the *Sermo Angelicus* text (" Bruket av cursus i fem latinska verk med svenskt ursprung ", a typewritten study discussed in the latin seminar held in Stockholm on 22 October 1974).

However, pattern 9 must be considered separately. The observed frequency (54 cases = 14.5 %) is less than the expected frequency (81 cases = 21.8 %), but this expected frequency is far too high. This may be seen from a comparison with the " Average " column (i.e. by means of an external comparison). In the average, unrythmical author, pattern 9 amounts to 7.4 % only. The false figure of 21.8 % in the *Sermo Angelicus*, " Expected Frequency " column is due to a distortion inherent in the internal-comparison method, a distortion termed " neighbor effect " (Janson, pp. 27 f.; this is a different type of error than the one discussed in the previous section although the two types have much in common). Thus, as regards pattern 9, the internal-comparison method fails and we have to recognize that the observed frequency of pattern 9 in the *Sermo Angelicus* is so much higher than the frequency in works of unrhythmical authors that pattern 9 was probably intended by the *Sermo Angelicus* author.

Thus, it was the *Sermo Angelicus* author's intention to favour pattern 9 (trispondiacus), pattern 10 (velox) and pattern 12 (tardus) [8]. Now, as regards the textual criticism, are we entitled to use this intention on the author's part to prefer one variant reading to another, as has been proposed ? And is the

8. I have stated that these patterns were intended because the observed frequencies are well beyond the expected frequencies. There is an uncertainty, however, arising from the fact that a pattern with a low observed frequency could, theoretically, also be intended. When the *Sermo Angelicus* author favoured patterns 9, 10 and 12, this implies as a consequence that the other patterns appear in lower numbers than they would have done, if he had not favoured patterns 9, 10 and 12. Now, assume, for example, that the *Sermo Angelicus* author cared not only for patterns 9, 10 and 12, but also for pattern 16 (planus), although his care for pattern 16 was not as outspoken as his care for the other patterns. It is possible then that, although the 33 observed instances of pattern 16 are so close to the expected frequency (29 instances) that they do not allow the conclusion that pattern 16 is intended, there is, nevertheless, an intention behind these 33 instances and that the figure would have been still lower, if the *Sermo Angelicus* author had not, at least to some extent, favoured pattern 16. In other words, an observed frequency, which is equal to or even lower than the expected frequency, may sometimes be due to an intention which is, so to speak, concealed and without which intention the frequency would have been still lower. This uncertainty is inherent in the traditional handling of the cursus concept as well as in the method proposed in this paper and it seems impossible to get rid of it. It is one of several factors which render the use of cursus in textual criticism dubious.

intention by itself a determining factor of any value in favour of one alternative reading or the other? For example, in *Sermo Angelicus* 9:16 we have to make a choice between these two readings:

...*miserabiliter incurrerunt.* Pattern 10, velox, intended.
...*inseparabiliter incurrerant.* Pattern 13, not intended.

If, in this particular case, the striving for cursus has its alleged value as a criterion in choosing between variant readings, one should prefer the pattern-10 reading *miserabiliter incurrerunt* to the pattern-13 reading *inseparabiliter incurrerant*, simply because the former constitutes a cursus, whereas the latter does not [9]. Such a coarse method is, of course, completely deceptive.

9. The text (*Sermo Angelicus* 9:15 f.) runs: *Dolebant enim vehementer prophete videntes filios Israel pro superbia et carnis petulancia legem Moysi deserere et elongata ab eis diuina caritate iram Dei super eos irruere; exultabant autem prenoscentes, quod ipse legum dictator et dominus ex tua humilitate et tue vite puritate, o Maria, stella prefulgida, placaretur et quod reciperet eos in suam graciam, qui ipsum ad iram prouocauerant et suam indignacionem miserabiliter incurrerunt* (var. *inseparabiliter incurrerant*). In editing the text, I chose the reading *miserabiliter incurrerunt* for two very good reasons. The *Sermo Angelicus* text has been handed down to us as part of three different mediaeval collections of texts, viz. as part of St. Bridget's revelations, as part of the Bridgettine breviary and as part of a collection entitled *Celeste Viridarium*. Now, I based the edition of this chapter on five manuscripts containing the revelations, on three manuscripts containing the breviary and on two manuscripts containing the *Celeste Viridarium*. All these 10 manuscripts offer the reading *miserabiliter incurrerunt*, except for one of the revelations manuscripts (y), which offers *inseparabiliter incurrerant*; the y manuscript does not have a good position in the *stemma codicum*. Thus, there can be no doubt whatsoever that the archetype from which the *Sermo Angelicus* text of the three traditions is derived had the reading *miserabiliter incurrerunt* (and that the other reading is an error in the y manuscript). This I considered, and still consider, a decisive argument. Furthermore, from the point of view of content, the reading *miserabiliter incurrerunt* is superior. It is true that the *incurrerant* of the reading *inseparabiliter incurrerant* appears to be more natural than the *incurrerunt* of the reading *miserabiliter incurrerunt* (with regard to the preceding *prouocauerant*), but, on the other hand, the adverb *inseparabiliter* does not fit the context as well as does *miserabiliter*. First of all, it is somewhat odd to combine *inseparabiliter* with an expression of movement, such as *incurrere in* + the accusative. This brings about a kind of consecutive meaning of *inseparabiliter*: "... who (= the sons of Israel) had provoked his (= God's) wrath and incurred his anger in such a way that they would never be free of it". Secondly, the consistency is inferior, since it is said explicitly in the text that God was to forgive the sons of Israel on account of St. Mary's merits and, accordingly, God's anger was not to rest *inseparabiliter* on them. It is true that these two

The intention concept only tells us that cursus is intended in a text and tells us nothing at all about the degree of intention, which may, theoretically, range from just a couple of percentage points above the expected frequency up to a total of almost 100 %, i.e. when there is an intended cursus in almost every sentence.

Since the intention may vary to such an extent, the intention concept, as such, is useless for the present purpose, i.e. for calculating the probability that either of the two readings was in the original; in doing that, we must make the percentage the basis of the calculation in one way or another.

FREQUENCY REQUIRED

It is customary to take all the sentences with intended cursus in a text to form one group and all the other sentences to form another group. In the *Sermo Angelicus* text, the sentences with intended cursus amount to 14.5 + 23.7 + 13.4 = 51.6 %. The sentences without intended cursus, accordingly, amount to 48.4 %. It is obvious that the editor of the *Sermo Angelicus* text, having to make a choice between a reading with an intended cursus, for example, pattern 10 *miserabiliter incurrerunt*, and a reading without such a cursus, for example, pattern 13 *inseparabiliter incurrerant*, could by no means prefer the former reading with reference to the advantage of 51.6 % against 48.4 %. As long as the intended cursus only appear in about 50 % of the sentences, they are useless for the present purpose and the editor would only have the same reliability in using the cursus concept as he would if he tossed a coin in choosing.

Thus, if one wishes to stick to the method of using the percentage for all sentences with intended cursus and the

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objections are by no means so serious as to render the reading *inseparabiliter incurrerant* impossible from the point of view of content, but they are at least more serious than the objection to the change of tense brought about by the reading *miserabiliter incurrerunt*.

Thus, there are two good arguments in favour of the reading *miserabiliter incurrerunt*, i.e. the testimony of the manuscripts and the testimony of the context, and I based my choice on these two arguments. The cursus argument was not overlooked; it was simply not worth looking at.

percentage for all other sentences in this way, one must at least state a limit, i.e. define what difference between the two percentages may be regarded as decisive. Is 70 % of sentences with intended cursus against 30 % of sentences without cursus decisive ? Is 80 % against 20 % decisive or maybe 90 % against 10 % ? This question can only be settled by using common sense. Since the method means applying statistics to one individual case, which is a statistically unsound procedure, we must compensate by requiring a very high percentage (for a further discussion of this matter of principle, see under the heading " Probability required " below). It seems obvious that 70 % against 30 % is far to small a predominance to allow of any conclusions being drawn with reasonable reliability concerning one single passage. I would venture the statement that the sum total of intended cursus must be at least over 90 % to be used for this purpose and that a high reliability is not obtained until the percentage exceeds 95 % [10].

However, there are some other shortcomings in the traditional method, which have forced me to abandon the kind of calculation described above and to try a new approach to the problem.

SHORTCOMINGS OF THE TRADITIONAL METHOD

I shall point out two of these shortcomings. First of all, it is wrong just to bring all the patterns of intended cursus together in one group. This means that a reading with intended cursus

10. Scholars who use cursus (or metrical clausulae) in their textual criticism often fail to state what limit they consider decisive (cf. note 2). Sometimes they make such statements but have adopted such low limits that practising witchcraft would have been almost equally reliable. Thus, for example, B. Bergh in one of his editions (*Den heliga Birgittas Reuelaciones, Bok VII, Samlingar utgivna av Svenska Fornskriftsällskapet, Serie 2, Latinska skrifter VII:7*, Diss., Uppsala 1967, pp. 96 f.) uses cursus as an argument concerning two passages (Rev. VII 19:5 and 28:8 [in the former case the cursus forms an auxiliary argument, in the latter case it is the only argument]), in spite of the fact that there are cursus only in 57 % of the sentences (furthermore, this figure, 57 %, refers to the sentence endings only, whereas the two passages on which Bergh passes judgement are not sentence endings but endings of clauses within sentences).

gets the support not only of the sentences with this particular pattern but also of all the other intended patterns as well. Take, for example, the letters of Honorius III. According to the following survey, the sentences with intended cursus amount to 96.5 % and the sentences without intended cursus amount to 3.5 % (the figures have been calculated from the appendix in Janson's book, p. 113 no. 37).

Pattern 10, velox, intended	62.2 %	96.5 %
Pattern 14, var. of velox, intended	12.0 %	
Pattern 16, planus, intended	16.9 %	
Pattern 25, var. of velox, intended	5.4 %	
All other patterns, not intended	3.5 %	

Now, according to the traditional method, in a choice between a pattern-10 velox reading and a reading belonging to the " other patterns " group, the probability would be 96.5 % against 3,5 % in favour of the velox reading. In another choice, between a pattern-16 planus reading and a reading belonging to the " other patterns " group, the probability is still 96.5 % against 3.5 % in favour of the planus reading. But this is not satisfactory. Considering the actual percentages for pattern-10 velox (62.2 %) and for pattern-16 planus (16.9 %), one must admit that, in the former case, the pattern-10 velox reading has a higher degree of probability (62.2 %) *vis-à-vis* the reading of the " other patterns " group than, in the latter case, the pattern-16 planus reading (16.9 %) has *vis-à-vis* the " other patterns " group. In other words, the traditional method ascribes the same degree of probability to a pattern-10 velox reading and to a pattern-16 planus reading, in spite of the fact that pattern-10 velox is almost four times as frequent in the text as is pattern-16 planus. Thus, it is not correct to merge all the intended patterns into one group since one and the same author does not favour all intended patterns equally.

For similar reasons, it is just as wrong for the present purpose to bring all the unintended patterns together in one group labelled " other patterns ", since some of these patterns are also more frequent than others (for example, it appears from Table 1 that pattern 20 is generally much more frequent than pattern 2). The correct procedure is to find a way of comparing

the probability of the actual patterns of the two readings involved in each particular case without merging any of them with any other pattern.

A second shortcoming of the traditional method is the inconsistency as regards the influence of the author's intention to create cursus. It is generally assumed — explicitly or implicitly — that it is exclusively this intention that enables us to make a choice. In other words, in texts without any intention on the author's part, no choice is possible. However, there are other factors than this intention to create cursus which also bring about differences of frequency (beside, of course, random variations, which are always present). In the traditional theory, the interaction between the desire to create cursus and these other factors has been neglected. I shall start here by describing two groups of such factors and propose to discuss their impact on the present problem in the following sections.

One group of factors I have termed " the structure of the language ". The importance of the structure of the language is apparent from the " Average " column of Table 1. There are considerable differences between some of the patterns in this column. It is worth while observing that the planus (pattern 16) is by far the most frequent of all patterns (12.6 %), that the trispondiacus (pattern 9) and the tardus (pattern 12) are also at the top of the list (7.4 % and 7.8 % respectively) and that the velox (pattern 10) has a comparatively good position (3.9 %). Differences of frequency between the 28 patterns in the writings of authors who did not care about cursus, as reflected in the " Average " column, must be due to factors specific to the language, such as the frequency of words of specific types, their liability to combine with each other and so on. Now, when an author uses cursus, he does not start from scratch, i.e. from an equal distribution of the patterns, but from the average distribution and his predilection for cursus is, so to speak, superimposed upon the average distribution. As a matter of fact, authors who cared about cursus did nothing but increase the frequency of some patterns which are already among the most frequent ones, a fact which seems to decrease considerably the value of the cursus concept as an instrument in textual criticism.

We found above that the *Sermo Angelicus* author favoured patterns 9, 10 and 12, which together appear in 51.6 % of his sentences. However, these 51.6 % are not exclusively due to the author's predilection for cursus. In the " Average " column of Table 1, i.e. in the writings of an average author who did not care about cursus, patterns 9, 10 and 12 amount to 7.4 + 3.9 + 7.8 = 19.1 % of the sentences. Acccordingly, in the *Sermo Angelicus* text, the author's predilection for cursus did not bring about cursus in 51.6 % of the sentences ; his predilection is responsible only for the increase from 19.1 % to 51.6 %, i.e. for 32.5 units of per cent. Now, if we want to stick to the (explicit/implicit) assumption that it is exclusively the author's intention to create cursus that enables use to make a choice in an individual passage, we must not — if we intend to act consistently — make the percentage 51.6 % the basis of our choice but only the increase caused by the author's intention, i.e. the increase from 19.1 to 51.6 units of per cent. Otherwise, we base our choice not only on the effect of the author's intention but also on the general structure of the language. This problem will be further discussed below, but, for the time being, I shall stick to the traditional view that the intention to create cursus alone is decisive.

There is another group of factors which must also be considered, viz. factors other than the predilection for cursus individual to each author. On comparing the *Homo Conditus* columns and the *De esse Dei* columns of Table 1, we find that the figures for certain patterns differ considerably. For example, pattern 5 appears on one occasion (0.3 %) only in *Homo Conditus* but on 21 occasions (5.6 %) in *De esse Dei.* Now, since the authors of these texts did not care about cursus, such variations must be due to factors other than predilection for cursus, factors which are, however, specific to each author (for example, the author's inclination to use certain words). There are, of course, several factors within this group and they cannot be specified. For the sake of brevity, I shall henceforth term this group " individual factors apart from cursus ".

To sum up, we must, first of all, abandon the coarse, traditional method of merging all types of intended cursus into one group. Instead, we must compare the frequencies of the two

individual patterns occurring in the two readings we are to make a judgment about. In doing this, we must be aware and consider the fact that the frequencies are dependent on three (groups of) factors, viz. [1] " the structure of the language ", [2] " individual factors apart from cursus " and [3] " the desire to create cursus ".

" THE STRUCTURE OF THE LANGUAGE " AND " THE DESIRE TO CREATE CURSUS "

Now we may reconsider the probability that the *Sermo Angelicus* author wrote pattern 10 *miserabiliter incurrerunt* rather than pattern 13 *inseparabiliter incurrerant* because he wanted to create a cursus. It appears from the " Average " column that patterns 10 and 13 amount to 3.9 % and 2.9 % respectively. This means that, if the *Sermo Angelicus* author had not cared about cursus but acted like the average author, he would have produced $3.9 \times 372 : 100 = 15$ sentences with pattern 10 and $2.9 \times 372 : 100 = 11$ sentences with pattern 13. This slight advantage for pattern 10 is due exclusively to the structure of the language. The advantage may be expressed in terms of estimated probability as follows [11].

Probability of pattern $10 = 15 : (15 + 11) = 0.58$.
Probability of pattern $13 = 11 : (15 + 11) = 0.42$.

The advantage of 0.58 for pattern 10, which is based upon the structure of the language, constitutes the basis upon which the author's intention to create cursus is superimposed. The *Sermo Angelicus* author write 88 sentences with pattern 10 and 9

11. Probability is calculated according to the following, well-known principle. The probability that one event, A, of two possible events, A and B, took place on one occasion is calculated from the formula :

$$\frac{\text{Total number of observations of the A event}}{\text{Total number of observations of the A and B events}}$$

The figures of probability range from 0 to 1 and my figures, i.e. 0.58 and 0.42, mean that, if the author had written 100 sentences with patterns 10 and 13, there would have been pattern 10 in 58 of these sentences, whereas pattern 13 would have occured in 42 of them.

sentences with pattern 13, a distribution which increases the estimated probability of pattern 10 considerably.

Probability of pattern 10 = 88 : (88 + 9) = 0.91.
Probability of pattern 13 = 9 : (88 + 9) = 0.09.

Now, the desire to create cursus increased the estimated probability of pattern 10 from 0.58 to 0.91 (at the same time, it decreased the estimated probability of pattern 13 from 0.42 to 0.09). If we stick to the idea that the intention to create cursus alone is decisive, we must ask ourselves whether the increase from 0.58 to 0.91 (i.e. an increase of 0.33 units) is enough for a decision. Before discussing that issue, I shall give another example, an hypothetical one from the *Chronicae Polonorum*, the author of which was much more fond of cursus than was the *Sermo Angelicus* author.

Suppose, in editing the *Chronicae Polonorum*, we had to make a choice between a pattern-10 velox reading (intended cursus, 167 occurrences ; see Table 1) and a pattern-20 reading (not intended, 9 occurrences). Intuitively, one would say that, in this case, the pattern-10 reading has a greater probability than had the pattern-10 reading in the *Sermo Angelicus* case above. Calculating the probability based on the structure of the language from the " Average " column, we arrive at an estimated probability of 0.30 for the pattern-10 reading and an estimated probability of 0.70 for the pattern-20 reading. Considering the observed frequency, however, in the *Chronicae Polonorum*, we find that the figures are, so to speak reversed, viz. 0.95 for the pattern-10 reading and 0.05 for the pattern-20 reading. In this case, we have, as expected, a much greater increase of probability (an increase from 0.30 to 0.95, i.e. 0.65 units) due to cursus than there was in the *Sermo Angelicus* case above (an increase of 0.33 units).

" INDIVIDUAL FACTORS APART FROM CURSUS "

In the preceding section, the probability offered by the structure of the language was considered the basis upon which the desire to create cursus was superimposed. In the *Sermo*

Angelicus case, the estimated probability of pattern 10 rose from 0.58 to 0.91 and in the case from the *Chronicae Polonorum* there was a rise from 0.30 to 0.95. However, such an increase is not exclusively due to the desire to create cursus but may also depend more or less on individual factors apart from cursus. In the writings of authors who did not care about cursus, such as *Homo Conditus* and *De esse Dei*, the frequencies of the different patterns deviate more or less from the "Average"-column values owing to individual factors apart from cursus. Such factors, of course, appear also in the writings of authors who cared about cursus. Accordingly, when such an author deviates from the "Average"-column values, the deviation may be due both to his desire to create cursus and to individual factors apart from cursus. Thus, the rises from 0.58 to 0.91 in the *Sermo Angelicus* case and from 0.30 to 0.95 in the *Chronicae Polonorum* case are not necessarily due exclusively to the desire to create cursus, since some part of the increase may be due to individual factors apart from cursus [12]. It is impossible to determine how much of the increase is due to the desire to create cursus and how much is due to other individual factors. Thus, there remains an uncertainty as regards the real influence of the predilection for cursus. This uncertainty is likely to be greater in texts in which there is comparatively little intention to create cursus, such as the *Sermo Angelicus*, whereas in texts with a greater degree of intention, such as the *Chronicae Polonorum*, this intention probably rules out the individual factors apart from cursus.

It can be shown, however, that the problem is serious, since the impact of the individual factors apart from cursus on the value of probability may sometimes be very great. This can be shown from an author who did not care about cursus, by picking out one pattern, the frequency of which exceeds considerably the average value, and another pattern, the frequency of which is considerably lower than the average value. In this case, the deviations from the average are due exclusively to

12. It may, of course, also be the other way round, viz. that individual factors apart from cursus caused a lower value than the average, which was then raised by the desire to create cursus. In such cases, the desire to create cursus is more important than appears from the calculations.

individual factors apart from cursus and from these figures we may calculate the maximum increase/decrease of probability due to these individual factors.

Take, for example, patterns 5 and 20 of the *De esse Dei* text. In the "Average" column of Table 1, pattern 5 amounts to 1.9 % and pattern 20 to 9.1 %. This means that, if the *De esse Dei* author acted like the average author, he would have produced 1.9 × 372 : 100 = 7 sentences with pattern 5 and 9.1 × 372:100 = 34 sentences with pattern 20. This yields the following degree of estimated probability (which is based exclusively on the structure of the language):

Probability of pattern 5 = 7 : (7 + 34) = 0.17.
Probability of pattern 20 = 34 : (7 + 34) = 0.83.

The actually observed frequency in the *De esse Dei* text, however, is different, owing to the influence of individual factors apart from cursus, viz. 21 instances of pattern 5 and 14 instances of pattern 20. The estimated probability with regard to these figures is as follows:

Probability of pattern 5 = 21 : (21 + 14) = 0.60.
Probability of pattern 20 = 14 : (21 + 14) = 0.40.

This means that the individual factors apart from cursus have, in this particular case, brought about an increase of estimated probability for pattern 5 from 0.17 to 0.60, i.e. an increase of 0.43 units of probability. This is more than the 0.33-unit increase brought about by cursus and other individual factors together in the *Sermo Angelicus* case above (but less than the 0.65-unit increase in the case from the *Chronicae Polonorum*). Since the individual factors apart from cursus can exert so great an influence on the value of probability and since this influence can never be separated from the influence caused by the desire to create cursus, there is, indeed, always an uncertainty as regards the actual influence caused by the desire to create cursus. Since, as I said above, the importance of the individual factors apart from cursus probably tends to decrease when the desire to create cursus increases, the uncertainty is at its maximum in texts whose authors had little intention to create cursus (such as the *Sermo Angelicus* author), whereas

the uncertainty is less in texts whose authors paid great attention to cursus (such as the *Chronicae Polonorum* author).

CORRECT EVALUATION OF THE PROBABILITY

In the discussions above, I have calculated the degree of probability with respect to three groups of factors, viz. the structure of the language, individual factors apart from cursus and the desire to create cursus. These calculations have given us an idea of the importance of the different factors and we have found that the desire to create cursus is not necessarily the most important one. I have assumed, however, that the desire to create cursus is the only factor that could enable us to make a choice in a particular case, which means that I took the increase of probability caused by this desire to be the decisive factor. I did so because it has been an explicit or implicit rule in the traditional handling of cursus that the intention on the author's part makes it possible to decide in individual cases. However, from the statistical point of view, this is completely wrong.

When the probability of an event has been statistically calculated, this probability is independent of how many and what factors it is based upon. I showed above that, in a choice between a pattern-10 reading and a pattern-13 reading in the *Sermo Angelicus* text, there was an estimated probability of 0.91 for the pattern-10 reading and an estimated probability of 0.09 for the pattern-13 reading. This means that, if the author had written 100 sentences with pattern 10 or pattern 13, there would have been 91 sentences with pattern 10 and 9 sentences with pattern 13. In some of the 91 sentences, the author wrote pattern 10 under the influence of the structure of the language, in others he may have done so on account on individual factors apart from cursus and in yet others, finally, he did so because he wanted to create a cursus. However, it is irrelevant to the degree of probability which reason was the decisive one in each particular case. In other words, the estimated probability is 0.91 (= 91 %) that the author wrote the pattern-10 reading in the sentence. He may have been forced to do so by any of

the three (groups of) factors, but it is irrelevant which factor forced him ; the result still remains a pattern-10 sentence.

Someone may object that there is an important difference between the factors, since the desire to create cursus is conscious, whereas the other factors are not. Indeed, this is a difference, but it does not affect the value of probability, upon which the choice of reading must be based. As I have already said above, what matters to us is the probability that the author wrote a pattern-10 reading in the passage, not the reason why he did so and not whether it was a conscious or an unconscious reason.

Having stressed the fact that cursus could not and should not be treated otherwise than the other factors discussed above if one wants to stick to the correct statistical procedure, I would point out a methodological inconsistency in the traditional handling of cursus. As I have already said several times, it has been an explicit or implicit assumption that only the intention to create cursus could be used to make a choice. Nevertheless, no attempt has ever been made — as far as I know — to isolate the influence of the desire to create cursus from the other factors, i.e. the structure of the language and individual factors apart from cursus. On the contrary, in the traditional handling, in which all patterns of intended cursus were merged into one group and a choice was based on the resulting percentage (see " Frequency required " above), this choice was obviously based not only on the desire to create cursus, but on all other factors as well, i.e. on the structure of the language and on individual factors apart from cursus. Thus, the traditional method implies an inconsistency : theoretically, the choice is based exclusively on the desire to create cursus, but in practice it is based on all the other factors as well (which is, as a matter of fact, the statistically sound procedure).

Now, the fact that the desire to create cursus could not be treated otherwise than the other factors, i.e. that cursus is just one factor alongside other factors, has a very important consequence. It necessarily implies that a choice could be based exclusively on the other factors in texts whose authors had no intention to create cursus. If, in the *Homo Conditus* text, we had to make a choice between a pattern-16 reading (42 in-

stances, see Table 1) and a pattern-5 reading (1 instance), the estimated probability would be 42 : (42 + 1) = 0.98 in favour of the pattern-16 reading, which is a pretty good degree of probability. In this case, the probability is based on the structure of the language and on individual factors apart from cursus but not on any desire to create cursus. Nevertheless, from the statistical point of view, it is just as reliable as a value based on all three (groups of) factors, i.e. a value calculated for a text whose author intended to create cursus.

Thus, the importance of the cursus concept has to be reduced considerably. It is one of the factors which determine the different frequencies of the different patterns, and the probability must be calculated on the basis of all these factors, not exclusively on the desire to create cursus. It is true that, in texts whose authors were very fond of cursus, such as the *Chronicae Polonorum*, the desire to create cursus predominates to such an extent that the other factors are of little or no importance at all. In other texts, such as the *Sermo Angelicus*, the authors of which paid some, although not very marked attention to cursus, all three (groups of) factors are relevant. In texts, finally, the authors of which did not care about cursus, the frequencies of the patterns are determined only by the structure of the language and by individual factors apart from cursus. Statistically, a probability figure may be calculated for all these types of texts and may be used with equal justification in all of them [13].

13. The extension of the method to texts without cursus involves a problem. In Table 1, the 28 patterns are based on the last two words of each sentence. There are, however, some exceptions, in which three or more words are considered. In pattern 14, there are three words, and pattern 14 is, so to speak, a subdivision of pattern 15. The same goes for pattern 18, which is a subdivision of pattern 19. Patterns 22-23 are subdivisions of pattern 24 and pattern 25 is a subdivision of pattern 26. Since these subdivisions form variants of the velox, tardus and planus patterns, they were justified as long as cursus was considered the only decisive factor. However, in texts in which the desire to create cursus plays a small rôle or even does not exist, these subdivisions may cause errors, as will appear from this hypothetical example.

Suppose that, in the *De esse Dei* text, one had to make a choice between a pattern-8 reading (27 instances, see Table 1) and a pattern-22 reading (1 instance). There seems to be a great probability in favour of the pattern-8 reading, viz. 22 : (22 + 1) = 0.96. However, the low number of pattern 22 (1

PROBABILITY REQUIRED

We found above that, in the *Sermo Angelicus* case, there was an estimated probability of 0.91 in favour of the pattern-10 reading *miserabiliter incurrerunt* (and an estimated probability of 0.09 in favour of the pattern-13 reading *inseparabiliter incurrerant*). In the hypothetical case from the *Chronicae Polonorum*, the estimated probability was 0.95 in favour of the pattern-10 reading (and 0.05 in favour of the pattern-20 reading). Now we may ask whether these probability figures are enough for a decision or not or, in other words, how great a degree of probability is required.

This is the most crucial point of the entire procedure. Normally, when one applies statistics, one has to calculate the outcome for a good many events, for example, a hundred or a thousand. One may then choose a limit of probability which is suitable for the purpose. If one chooses a limit of, say, 0.95, this means that one of the possible outcomes appears in 95 cases and the other outcome in five cases; for a total of 1000 cases, the figures are 950 and 50 respectively. In other cases, for other purposes, one may go down, for example, to a probability of 0.70, in which case one of the outcomes will appear in 70 cases out of 100 and the other outcome in 30 cases. The vital point is that, in dealing with a large number of cases in

instance only) is due merely to the fact that it is made up of no less than four words, whereas pattern 8 is made up of two words only. In order to make the comparison more correct, we must consider only the last two words of pattern 22, which means that patterns 22, 23 and 24 should be made into one pattern, which is to be compared with pattern 8. There are 1 + 15 + 11 = 27 instances of patterns 22-24 and on comparing this figure with pattern 8, we find that the odds are 27 against 27, i.e. a probability of 27 : (27 + 27) = 0.5. No choice is possible.

As far as I can see, the best solution is to get rid of the subdivisions by considering only the last two words, i.e. merge patterns 14 and 15 into one pattern and do the same with patterns 18-19, 22-24 and 25-26 respectively. However, this remains something of a problem. The most exquisite statistical method yields erroneous results if the assumptions are wrong. Thus, if the distribution into patterns is not an adequate distribution, the result becomes unreliable. Although I regard it as the best solution to consider only the two last words, it is hard to prove that this is correct and there remains some uncertainty as regards this problem.

this way, one may always adapt the limit of probability required to the demands of precision raised by the nature and the purpose of the investigation. One is, so to speak, always in control of the reliability and its influence on the result.

The situation is totally different in the present case, since we are applying statistics to one singular case. This particular case may belong to either of the two possible groups (i.e. the sentences with pattern 10 and the sentences with pattern 13 respectively). It is, indeed, more likely that it belongs to the group with the greater degree of probability (the pattern-10 sentences), but we can never be sure, since, if we are unlucky, it may belong to the other group (the pattern-13 sentences). This uncertainty is of a different kind from the one described above, in which we are making predictions about a large number of cases and know how many of our predictions are right and how many are wrong (but not which ones are right and which ones are wrong). Statistics make it possible to know *how often* we are right and wrong but not exactly *when* we are right and wrong. What we are trying to do, however, is to find out whether our guess is right in one particular case, i.e. to find out *when* we are right and wrong, which the statistical method is actually unable to tell us. Thus, the main uncertainty in this case arises from the unsound procedure of applying statistics to one single passage. Of course, the uncertainty decreases when the probability increases. In order to compensate this uncertainty to some extent, we must require a very high degree of estimated probability and it seems reasonable never to go down below 0.90 and to require normally at least 0.95. In spite of such precaution we shall never be able to compensate totally the fact that it is, after all, a nuisance to apply statistics to a single passage [14].

14. As I have said above (notes 2 and 10), scholars, who have used cursus or metrical clausulae in their textual criticism generally omit to discuss, or discuss in very general terms, what frequency there must be in a text to enable conclusions to be drawn concerning an individual passage. However, I have found one paper which is interesting, since it allows direct comparisons with the probability 0.95 postulated above. A. Fridh, in his dissertation (see note 2 above), has used cursus as an instrument of textual criticism in several passages of the *Variae*, basing his study on previous investigations carried out by M. J. Suelzer and H. Hagendahl. The cursus appearing in the *Variae* are of a

This means that the method could be applied in the hypothetical *Chronicae Polonorum* case (the estimated probability is 0.95) but that the *Sermo Angelicus* case is just at the limit (estimated probability 0.91). Since in the *Sermo Angelicus* case, there are other arguments which are reliable (note 9), the rhythm is best left aside.

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specific kind. Almost every cursus in the text forms not only a cursus but also, at the same time, a metrical clausula. Fridh concludes that, if a cursus in the text is at the same time a metrical clusula, this is due to intention on the author's part. If, on the other hand, a cursus does not form a metrical clausula, there is no intention and the cursus is just occasional. Fridh then (p. 10) gives some typical examples, in which his conclusions may be used for textual criticism, for example, 5,2,2 *...fuisse suscepta/...suscepta fuisse*. Both readings form a cursus planus but only the former is metrically correct and Fridh therefore prefers the former reading. It may be concluded from Fridh's statistical tables that the former type of cadence (˘ ˗ ◡ | ˗ ˘ ◡) appears in 2021 sentences of the *Variae*, whereas the latter (˘ ˗ ◡ | ◡ ˗ ˘ ◡) appears in 23 sentences only. Inserting these figures in the formula, we arrive at an estimated probability of 2021 : (2021 + 23) = 0.99 for the former reading. This is a very high degree of probability and Fridh is certainly right in his conclusion.

Fridh then continues with a warning : " D'un autre côté, il n'est pas permis de rejeter une clausule de prosodie moins correcte exclusivement à cause des faits métriques, à moins que cette forme ne soit indubitablement évitée par l'auteur. " He then gives the example 1,44,2 *...paterentur ultorem/...paterentur ultionem*, concerning which he states " Le fait que la clausule ˘ ˗ ◡ ˗ ˘ ˘ est représentée 2021 fois dans les Variae (29,40 % du nombre total), tandis que le type ˘ ˗ ◡ ˗ ◡ ˘ ˘ n'atteint que le chiffre de 157 ex. (2,28 %), ne suffit pas pour nier l'existence éventuelle de ce dernier dans un cas particulier. Il serait donc prudent de limiter l'application de la méthode poursuivie dans la présente étude aux seuls cas, où l'une ou l'autre des variants douteuses établit une clausule ou bien tout à fait inacceptable ou du moins manifestement évitée par l'auteur. "

The vital point in this is that, taking the figures for the last case and inserting them in the formula, we arrive at a probability of 2021 : (2021 + 157) = 0.93. Thus, basing his judgement on a commonsense evaluation of the frequencies, Fridh has arrived at a statement implying that cursus should not be used in textual criticism unless the probability is above 0.93. This is about the same limit as I have stated and it implies that Fridh would never have accepted cursus as an argument in the case from the *Sermo Angelicus*. It should also be noticed that Fridh has adduced as a reason for his caution the fact that the decisions concern individual passages (" ... dans un cas particulier " in the quotation above).

CURSUS AND *LECTIO DIFFICILIOR*

The intention to create cursus is a conscious factor, the other factors are not conscious, and I have said above that this difference is of no importance in statistical considerations. However, there is one type of argumentation which is actually based on the consciousness of the author's using cursus.

In a choice between a cursus reading and a reading without cursus, it sometimes happens that the cursus reading appears to be somewhat odd or inferior from the point of view of syntax and/or content. In such cases, it is sometimes argued that the author, in his passion for cursus, wrote the inferior reading in order to create a cursus ; later on, a scribe, who did not realize this motive for the inferior reading, changed the passage by improving the syntax/content. This argument may be described as a combination of the cursus argument and a kind of *lectio difficilior* argument. However, it has certain limitations which have not always been observed.

First of all, the value of the combination of the two arguments depends to a considerable extent on the degree of intention to create cursus. It is more likely that an author who was extremely fond of cursus impaired the syntax/content or produced odd expressions in order to create a cursus than that an author who was only slightly interested in cursus did the same thing. The former author had, so to speak, a greater motive for impairing the syntax/content, whereas the latter author could more easily abstain from creating a cursus, when difficulties arose, and wait for a passage in which a cursus was more easily obtained. In other words, the combination of cursus and *lectio difficilior*, as described above, may perhaps sometimes be of value in texts with a high degree of intention, such as the *Chronicae Polonorum* [15]. In texts with a low degree of intention, however, such as the *Sermo Angelicus*, the cursus concept is, in

15. Or (when metrical clausulae are concerned) in Seneca's *Epistulae morales* (cf. Axelson, Neue Senecastudien [see note 2 above], pp. 31 ff.). For different peculiarities caused by the author's desire to create cursus, see Szantyr (note 2 above), pp. 719 ff.

itself, of low or no value and the *lectio difficilior* argument is also, in itself, of low value. It is a basic rule of scholarship that two bad arguments never form one good argument and this rule holds true also in this case.

A second limitation is the following one. The cursus/*lectio difficilior* argumentation presupposes that the author impaired the syntax/content or produced an odd expression in order to create a cursus. Such a statement should never be made without thorough checking the author's stylistic practice. Before we apply the cursus/*lectio difficilior* argumentation, we must show, not only that there are cursus in the text, but also that there are several other passages in which the author, in his desire to create cursus, impaired the syntax/content or created odd expressions in the same (or a similar) way as we suspect him to have done in the particular pasage (and these other passages must be beyond doubt from the point of view of textual criticism).

PRACTICAL HANDLING OF THE METHOD

Statistical probability based on the frequencies of the different types of cadences may be used with equal justification in all types of texts, not only those whose authors cared about cursus. In making a choice between two readings, one has to know the number of occurrences of the two patterns in the text (or in a sample of it). Then one may calculate the probability of the more frequent of the two patterns (= pattern A) having been in the passage according to the formula

$$\frac{\text{Number of occurrences of pattern A}}{\text{Number of accurrences of patterns A and B together}}$$

Inserting the figures for the case from the *Sermo Angelicus*, i.e. pattern 10 *miserabiliter incurrerunt* (88 instances of pattern 10; see Table 1) and pattern 13 *inseparabiliter incurrerant* (9 instances of pattern 13), we arrive at the following result:

$88 : (88 + 9) = 0.91.$

The value of estimated probability in such a case may range

from 0.51 to 0.99 and, since we are applying statistics to one individual case, a very high degree of estimated probability is required, preferably 0.95 and never below 0.90.

CONCLUSIONS

The following conclusions may be drawn. The traditional method of using cursus in textual criticism is inadequate, because all intended patterns are merged into one group, the percentage of which is considered decisive. This is wrong, since a reading with one pattern cannot be supported with reference to the frequencies of other patterns. It also happens that very low percentages, such as 52 % against 48 %, have been considered decisive. Furthermore, there is an opposition between theory and practice. Theoretically, it is argued that the desire to create cursus is the only decisive factor, but in practice other factors, viz. the structure of the language and individual factors apart from cursus, are also included in the calculations.

From the statistical point of view, the only sound method is to compare only the two patterns involved with each other, basing the comparison on all relevant factors, i.e. the structure of the language, individual factors apart from cursus and the desire to create cursus (if there is any). This means that cursus is just one factor among several others and also that the method may be applied with equal justification in all texts, even texts whose authors had no intention whatsoever to create cursus. The practical handling of the method has been outlined in the preceding section. Since a very high degree of probability (0.95) must be required and since there still remains so great a degree of uncertainty that other arguments (arguments from the stemma codicum, syntax and contents) are generally more reliable, I presume that an editor with a sound judgement will find that the method has very limited value.

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